

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-9 are pending in this application. Claims 1, 5, and 8 are independent.

Allowable Subject Matter

Applicants thank the Examiner for noting that claim 2 would be allowable if re-written into independent form. Applicants wish to pursue the patentability of all pending claims at this time, however.

Telephone Discussion – Atkinson Reference

Applicants spoke with the Examiner on Thursday, April 03, 2008 regarding a reference cited by the Examiner in his Response to Arguments but not otherwise included in any substantive claim rejections in the most recent Office Action.

The Examiner relies on U.S. Patent 6,961,476 to Atkinson (hereafter “Atkinson”) for a definition of an image feature. The Examiner stated, however, that he does not intend to include Atkinson as a reference against the present invention, relying instead only on the specific excerpt cited in his response to arguments on Page 3 of the Office Action.

Since the Atkinson reference is not included as a reference in the rejection made by the Examiner, and since the Examiner concedes that the Atkinson definition was actually inconsistent with his interpretation of the Kotaki reference, Applicants understand the Examiner to be taking Official Notice of a definition of a “feature value” and therefore challenge the Examiner to produce prior art supporting his asserted definition.

“It would not be appropriate for the examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known.” (MPEP §2144.03.A). Here, given the

discussion that the Examiner and Applicants' Representative have had regarding what the proper definition of a "feature value" is, Applicants respectfully submit that any definition of a "feature value" relied upon by the Examiner be supported with a prior art reference as required by MPEP §2144.03.

Because the Atkinson reference is not currently cited as prior art against the present invention, Applicants will only respond to the specific excerpt cited by the Examiner and will not address any other teachings of Atkinson or the possibility or propriety of their combinability with Kotaki or Adams in this Response (other than to state that Applicants do not admit that Atkinson may be properly combined with any currently cited prior art reference).

35 U.S.C. § 102 Rejection

Claims 1, 3, and 4 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,229,578 to Acharya (hereafter "Acharya"). Applicants respectfully traverse this rejection.

Acharya teaches a method "for removing noise by distinguishing between edge and non-edge pixels" and applying different noise removal techniques to edge and non-edge pixels, the noise removal occurring before color interpolation. (Abstract). Specifically, Acharya teaches performing edge detection and gradient analysis operations on localized image regions that are either specified by a pixel dimension or a percentage of the total image. (Col. 4, lines 29-42).

Claim 1

Independent claim 1 pertains to an image processing method that begins with "a feature value calculation step of calculating feature values of micro regions in a specified region having a pixel of interest at a center." Independent claim 1 further requires "an edge intensity value calculation step of calculating an edge intensity value in a neighborhood of the pixel of interest."

The localization region of Acharya is not taught or suggested as “having a pixel of interest at a center” as required by independent claim 1. Acharya does not discuss or evaluate pixels within the localization region until the process of gradient-based edge detection, whereupon a gradient mask is applied to “each and every pixel in the localization region.” (Col. 4, lines 43-65). Acharya therefore does not identify or otherwise suggest that there is “a pixel of interest at a center” of the localization region.

With respect to Acharya’s edge detection and gradient analysis, there is again no teaching or suggestion of a “pixel of interest” until after the edge detection thresholding process, whereby Acharya divides pixels into edge and non-edge pixels. (Col. 5, lines 12-32). Acharya can therefore not teach or suggest “an edge intensity value calculation step of calculating an edge intensity value in a neighborhood of the pixel of interest” as required by independent claim 1 because there are no “pixels of interest” identified in Acharya until the edge and non-edge pixels are discriminated by thresholding after gradient intensity analysis.

At least in view of the above, Applicants respectfully submit that Acharya does not teach or suggest an image processing method comprising, in part, “a feature value calculation step of calculating feature values of micro regions in a specified region having a pixel of interest at a center,” and “an edge intensity value calculation step of calculating an edge intensity value in a neighborhood of the pixel of interest” as required by independent claim 1. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claims 3 and 4

With respect to dependent claims 3 and 4, Applicants respectfully submit that the deficiencies of Acharya with respect to independent claim 1 are incorporated into these claims by virtue of their dependency on independent claim 1. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 103 Rejection – Kotaki and Adams

Claims 5, 6, and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,200,841 to Kotaki et al. (hereafter “Kotaki”) in view of U.S. Patent 7,023,487 to Adams (hereafter “Adams”). Applicants respectfully traverse this rejection.

Kotaki teaches a binarizing apparatus which can smooth edges in binarized images and can accurately binarize fine shading differences and light edges. (Col. 1, lines 42-56). Specifically, Kotaki teaches a binarizing circuit with an adaptive threshold (Fig. 1, item 11) where “the mean value of the data items of the surrounding pixels calculated by the mean value circuit is fed to a threshold circuit in order to determine a threshold for binarization.” (Col. 10, lines 46-67).

Adams is relied upon in the Office Action to teach interpolation from source image pixels located along detected edge orientation. (Page 7 of Office Action).

Telephone Discussion – Kotaki Reference

Applicants spoke with the Examiner on Thursday, April 17, 2008 regarding the teachings of the Kotaki reference in light of the Atkinson definition. As a result of the discussion, the Examiner stated that he agrees in principle that Kotaki does not teach binarizing an image feature value (using a definition of image feature consistent with the Atkinson definition) as required by independent claim 5. The Examiner stated, however, that he wishes to review Applicants’ written arguments before withdrawing the currently pending rejection. Applicants accordingly present written arguments below.

Claim 5

Independent claim 5 pertains to an image processing method comprising, in part, “a feature value calculation step of calculating feature values of micro regions in a specified region

having a pixel of interest at a center,” and “a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step.”

Either the mean value or the threshold calculated in Kotaki may be viewed as a calculated feature value. Neither of these feature values, however, is binarized in Kotaki as required by independent claim 5, which requires, in part, “binarizing the feature values of the micro regions calculated by the feature value calculation step.” Kotaki uses the calculated feature values to binarize the pixel value of a pixel of interest, and does not perform any binarization on the calculated feature values themselves.

Applicants further note that in responding to the arguments of the previous Office Action, the Examiner defines a feature as “a group of contiguous pixels ... having similar values.” (Page 3 of Office Action). The Examiner relies on Atkinson for this definition.

“Where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim.” (MPEP §2106.II.C). Applicants respectfully submit that since the Examiner admits that Applicants’ specification defines the term “feature value,” Applicants’ definition of that term must control interpretation of the term as it is used in the claims. Applicants therefore respectfully submit that even if the Examiner relies on Atkinson for a definition of the term “feature value,” such a definition cannot be inconsistent with how Applicants have defined the term “feature value” in their specification. Applicants respectfully submit that the Examiner must interpret Applicants’ claims in light of the definitions provided in their specification as required by MPEP §2106.

The Examiner suggests that Kotaki’s division of an image into an NxN window to calculate mean and threshold values (Col. 3 line 65 – Col. 4, line 12) is a feature value calculation process. Applicants agree, as stated above, that the mean and threshold values are feature values. Applicants further agree that such values are feature values of a feature within the definition given by the Examiner. Applicants do not agree, however, that the individual pixels, pixel locations or individual pixel values in Kotaki’s NxN window are calculated feature

values. According to the definition of Atkinson, a feature and therefore a feature value inherently spans at least “a group of contiguous pixels.” A single pixel is not a calculated feature value under any reasonable interpretation of the Atkinson definition, and is also inconsistent with the definition of a “feature value” as provided in Applicants’ specification.

Furthermore, a binarized feature value is drastically different from a binarized pixel. The binarization of pixels, in an image, will inherently result in changes to some of the features of the image. These changes, however, are neither direct nor calculated. The binarization of pixels neither requires nor implies that the features comprised of those pixels, and therefore the feature values associated with those features, are also similarly binarized. There is no direct or conceptual correlation between the effects of binarization on individual pixels in an image and the effects on the values of image features composed of those pixels. Kotaki only teaches the binarization of individual pixels based on calculated feature values, and therefore makes no direct or indirect teaching of binarizing or otherwise carrying out operations on calculated feature values.

Specifically, independent claim 5 requires binarizing calculated feature values and then using those binarized feature values for contour detection. The results of the contour detection are then used to correct “an image signal value of the pixel of interest using image signal values of a plurality of pixels including the pixel of interest in a same direction as the contour detected by the contour detection step.” The process of binarizing calculated feature values to allow for adjustment of individual pixel values as claimed in independent claim 5 is therefore extremely different from the pixel binarization process taught by Kotaki, and the binarization of feature values according to independent claim 5 requires no immediate effect on the pixels comprising the image simply because a calculated feature value is binarized.

Applicants therefore respectfully submit that under any reasonable interpretation of the Atkinson definition, Kotaki still fails to teach “a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step” as required by independent claim 5.

Applicants further submit that Adams is neither relied upon, nor can it properly be relied upon, to remedy the deficiencies of Kotaki in view of Atkinson's definition. Applicants therefore respectfully submit that neither Kotaki nor Adams, taken either alone or in combination (assuming the references may be combined, which Applicants do not admit) teach or suggest "a binarization step of binarizing the feature values of the micro regions calculated by the feature value calculation step" as required by independent claim 5. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claims 6 and 7

With respect to claims 6 and 7, Applicants respectfully submit that these claims are allowable at least by virtue of their dependency on independent claim 5. Applicants therefore respectfully submit that neither Kotaki nor Adams, taken alone or in combination (assuming the references can be combined, which Applicants do not admit) teach or suggest "binarizing the feature values of the micro regions calculated by the feature value calculation step" as required by independent claim 5. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 103 Rejection – Kotaki, Adams, and Cho

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kotaki in view of Adams and U.S. Patent 7,142,239 to Cho (hereafter "Cho"). Applicants respectfully traverse this rejection.

Independent claim 8 requires, in part, "binarizing the feature values of the micro regions calculated by the feature value calculation step." Applicants respectfully submit that both Kotaki and Adams are deficient in their teachings with respect to this claim limitation for the same reasons as set forth with respect to independent claim 5. Applicants further submit that Cho makes no teaching or suggestion of binarization, and therefore does not remedy the deficiencies of Kotaki or Adams with respect to independent claim 8.

Applicants respectfully submit that none of Kotaki, Adams, or Cho, taken alone or in combination (assuming the references may be combined, which Applicants do not admit), teach or suggest “binarizing the feature values of the micro regions calculated by the feature value calculation step” as required by independent claim 8. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 103 Rejection – Kotaki, Adams, and Acharya

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kotaki in view of Adams and Acharya. This rejection is respectfully traversed.

With respect to claim 9, Applicants respectfully submit that this claim is allowable at least by virtue of its dependency on independent claim 5. Applicants therefore respectfully submit that none of Kotaki, Adams, and Acharya, taken alone or in combination (assuming the references can be combined, which Applicants do not admit) teach or suggest “binarizing the feature values of the micro regions calculated by the feature value calculation step” as required by independent claim 5. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

In view of the above remarks, it is believed that claims are allowable.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact D. Richard Anderson, Reg. No. 40,439 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Application No. 10/553,424
Amendment dated June 19, 2008
Reply to Office Action of March 24, 2008

Docket No.: 1163-0536PUS1
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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By _____

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